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On the effectiveness of Settlement Procedure in the presence of partial ownerships

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Introduction to the Settlement Procedure

• The Settlement Procedure (SP)
  ✓ Introduced by the European Commission (EC) in June 2008
  ✓ Concerns cases where undertakings make a clear and unequivocal acknowledgement of participation and liability in relation to their participation in horizontal agreements (cartels)
  ✓ Its objective is not to replace the standard enforcement procedure for cartel cases
  ✓ Instead, it aims at simplifying and speeding up the handling of pending cases, as well as reducing the number of appeals against the decisions of Competition Authorities (CAs) before administrative courts

• What’s the incentive for firms to settle with CAs?
  ✓ If CAs decide to reward cartel participants for their cooperation during the SP, the final amount of the imposed cartel fine is reduced by 10%
Effectiveness of the Settlement Procedure

• Competition Authorities envision to induce the participation of all cartel firms in the SP
  ✓ This allows a better allocation of resources, in order to deal with more cases, thereby increasing the deterrence effect of their enforcement actions
  ✓ Hence, it is said that the SP is effective when inducing all cartel firms to settle with CAs (the non-hybrid SP)
  ✓ If only some of the undertakings settle with CAs, then the hybrid SP arises

• The challenging question
  ✓ Is the 10% reduction sufficient for the SP to be effective?
## Settlement Procedure & Leniency Program in practice

- **Highest cartel fines per case: 2001 – 2022 (30.03.2022)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
<th>Fine in €</th>
<th>Leniency Program</th>
<th>Settled Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016/2017</td>
<td>Trucks</td>
<td>3 807 022 000**</td>
<td>4 applicants</td>
<td>5 out of 6 firms</td>
</tr>
<tr>
<td>2019/2021</td>
<td>Forex (three-way Banana Split) (Essex Express)</td>
<td>1 413 274 000**</td>
<td>1 applicant</td>
<td>All (5 firms)</td>
</tr>
<tr>
<td>2012</td>
<td>TV and Computer Monitor Tubes</td>
<td>1 409 588 000**</td>
<td>-</td>
<td>All (4 firms)</td>
</tr>
<tr>
<td>2013/2016/2017</td>
<td>Euro Interest Rates Derivatives (EIRD)</td>
<td>1 308 172 000**</td>
<td>4 applicants</td>
<td>4 out of 7 firms</td>
</tr>
<tr>
<td>2014</td>
<td>Automotive Bearings</td>
<td>953 306 000**</td>
<td>5 applicants</td>
<td>All (6 firms)</td>
</tr>
<tr>
<td>2021</td>
<td>Car emissions</td>
<td>875 179 000**</td>
<td>2 applicants</td>
<td>All (3 firms)</td>
</tr>
<tr>
<td>2007</td>
<td>Elevators and escalators****</td>
<td>832 422 250**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2010/2017</td>
<td>Airfreight (air cargo carriers)</td>
<td>739 642 616**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2001</td>
<td>Vitamins****</td>
<td>790 515 000**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2013/2015</td>
<td>Yen Interest Rate Derivatives (YIRD)</td>
<td>669 719 000</td>
<td>5 applicants</td>
<td>6 out of 7 firms</td>
</tr>
</tbody>
</table>

**Source:** Laina & Bogdanov (2019); Cartel Statistics (EC, 2022)
Our paper... in a nutshell

• We challenge the effectiveness of the 10% reduction to fulfil the goal of CAs to induce the participation of all cartel firms in the SP

• We provide the conditions under which a given reduction of the cartel fine is sufficient to incentivize all cartel firms to settle with CAs

• We find a negative relationship between such reduction and the cartel detection probability

• We also challenge the robustness of this finding by allowing Partial Ownerships (POs) between the rival firms

• The effectiveness of the SP heavily depends on whether firms possess partial common or cross ownerships to each other
Partial Ownerships

- We consider POs either to have or to have no significant influence on corporate strategy

- Following the definition of POs given by de Haas and Paha (RIO, 2021), Heim et al. (AEJ: Microeconomics, 2022) and Lopez & Vives (JPE, 2019):
  
  ✓ Partial common ownerships (PcomOs) exist when large shareholders not only have significant POs in rival firms but also influence their corporate strategy

  ✓ Partial cross ownerships (PcrOs) are present when firms acquire other firms’ shares in the form of investments with no control rights, while acting in their largest shareholders’ financial interest by maximizing their own value and disregarding the impact of their actions on other firms’ corporate strategy
The model

• Two firms $i = 1, 2$ competing à la Cournot, face the inverse demand function $P = A - bQ$, where $Q = q_1 + q_2$

• They produce a homogenous final good at a cost $w_i \frac{c(q_i)^2}{2}$ with $w_1 = 1$ and $w_2 \equiv w \in [0, 1]$

• Therefore, the two firms are cost symmetric when $w = 1$; otherwise, firm 2 is the efficient firm and firm 1 is the inefficient one

• Let $\mu_i \in [0, 0.5)$ denote the POs of firm $i$ in firm $j$’s equity capital, with $i, j = 1, 2$ and $i \neq j$

• Each firm may: (i) reach a collusive agreement with its rival, thus both acting as a cartel monopolist; or (ii) settle with the CA to benefit from the percentage reduction on the cartel fine due to SP
Cartel formation

• We assume that cartel firms allocate output quotas like a multiplant monopolist allocating outputs between two plants (Patinkin, QJE, 1947)

• The goal of the monopolist is to maximize the following profit function:

\[ \pi_M = (TR - TC)(1 - \rho) - \rho(\kappa P_M Q_M) \]

where \( \rho \in [0,1] \) denotes the probability that the cartel would be detected, and the cartel fine is defined as a percentage (\( \kappa \)) of its revenue (\( P_M Q_M \)) realized once the cartel is detected.

• Equilibrium profits are:

\[ \pi_{i,M}^* = \frac{w}{w_i} \cdot \frac{(A[1 - \rho(1 + k)])^2}{4b[1 - \rho(1 + k)](1 + w) + 2c(1 - \rho)} \]
Settlement with partial common ownership

• Following de Haas and Paha (RIO, 2020) for modeling PcomOs, each Cournot competitor seeks to maximize:

\[ \pi_{i,S} = \left( P_S q_{i,S} - w_i \frac{c(q_{i,S})^2}{2} \right) (1 - \mu_j) + \mu_i \left( P_S q_{j,S} - w_j \frac{c(q_{j,S})^2}{2} \right) - (1 - \chi) (\kappa P_M q_{i,M}) \]

where \( \chi \in [0,1] \) represents the percentage reduction on the cartel fine \((\kappa P_M q_{i,M})\) due to settling

• Substituting the equilibrium quantity in \( \pi_{i,S} \) gives the equilibrium profit \((\pi^*_{i,S})\) of each firm when it decides to settle with the CA
Cartel formation Vs Settling with CAs

• Comparing $\pi_{i,M}^*$ and $\pi_{i,S}^*$ leads to closed-form solutions; however, the derived level of $\chi$ is a complex function of $A, w, c, \kappa, \rho, \mu_1$ and $\mu_2$

• Therefore, the presentation and the subsequent analysis are mainly based on numerical simulations

• In particular, we assume that: (i) $A = 5$ and $b = 1$; (ii) $c = 0.5$; and (iii) $\kappa = 0.1$, which reflects the current EC’s practice regarding cartel fines

• The comparison of $\pi_{i,M}^*$ and $\pi_{i,S}^*$ gives a critical value of $\chi$ (as a function of $\rho$) denoting by $\tilde{\chi}_i$ that makes firm $i$ indifferent between staying in the cartel and settling with the CA (i.e., $\pi_{i,M}^* = \pi_{i,S}^*$)
A benchmark case

• To better understand the impact of POs on the effectiveness of SP to induce all cartel firms settling, consider first the following benchmark case without $P_{\text{comOs}} (w = 0.8, \mu_1 = 0, \mu_2 = 0)$

• Main findings
  ✓ Area A: Both firms are better off by staying in the cartel
  ✓ Area B: The hybrid case arises with only the less efficient firm opting for the SP
  ✓ Area C: The non-hybrid case arises with both firm settling with the CA
  ✓ The effective cartel fine reduction is negatively correlated with the likelihood that the cartel would be detected
Introducing partial common ownerships

- Considering the current European practice (i.e., $\bar{\chi} = 10\%$), we can derive each firm’s “indifferent” cartel detection probability ($\rho_i^{\bar{\chi}}$) as a function of the inefficient firm’s $PcomOs$ ($\mu_1$) for several POs of the efficient firm ($\mu_2$).

### Main Finding 1:

The firm increasing its $PcomOs$ faces higher incentives to enter the settlement procedure, as opposed to the target firm which increases its preference for the cartel formation $\Rightarrow$ The hybrid cases are more probable.

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Settlement with partial cross ownership

- Following de Haas and Paha (RIO, 2020) for modeling $PcrOs$, each Cournot competitor seeks to maximize:

$$\Pi_{i,S} = \left( P_S q_{i,S} - w_i \frac{c(q_{i,S})^2}{2} \right) + \mu_i \left( P_S q_{j,S} - w_j \frac{c(q_{j,S})^2}{2} \right) - (1 - \chi)(\kappa P_M q_{i,M})$$

where $\chi \in [0,1]$ represents the percentage reduction on the cartel fine ($\kappa P_M q_{i,M}$) due to settling.

- The only difference between modelling $PcomOs$ and $PcrOs$ is that, in the latter case, each firm maximizes its profit as it appears in its income statement (in modelling terms, own profits are not multiplied by $1 - \mu_j$).

- Substituting the equilibrium quantity in $\pi_{i,S}$ gives the equilibrium profit ($\Pi_{i,S}^{(*)}$) of each firm when it decides to settle with the CA.
Introducing partial cross ownerships

• Considering the current European practice (i.e., $\bar{\chi} = 10\%$), we can derive each firm’s “indifferent” cartel detection probability ($\rho_i^{\bar{\chi}}$) as a function of the inefficient firm’s $PcrOs (\mu_1)$ for several POs of the efficient firm ($\mu_2$)

• **Main Finding 2:** An increase in the $PcrOs$ of either firm, provides both firms with higher incentives to enter the settlement procedure $\Rightarrow$ The non-hybrid cases are more probable
Comparing common and cross partial ownership

- **Main Finding 3:** Regardless of the form of partial ownership, as firms become more asymmetric, the inefficient firm has more incentives to settle, as opposed to the efficient firm which prefers the cartel formation for more parameter values ⇒ The hybrid cases are more probable

- **Main Finding 4:** Under the same levels of the cost efficient parameter \(w\) and the POs parameter \(\mu_i\), settlement is more likely to arise in equilibrium under PcrOs than under PcomOs
Conclusions

• In this paper, we present the conditions under which a given reduction on cartel fines is effective in fulfilling the goal of inducing all cartel firms to participate in the settlement procedure.

• We show that a higher probability of cartel detection is required for a lower reduction to be effective.

• Settlement is more likely to arise in equilibrium: (i) under cost symmetry; and (ii) under partial cross ownership rather than under partial common ownership.

• Therefore, the presence of partial ownerships among rival firms may enhance the effectiveness of the settlement procedure, as opposed to their negative impact on competition under a Leniency Program.
Thank you for your attention

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